Appl. No. : **09/611,177**
Filed : **July 6, 2000**

1. Objection to Specification

In the above-mentioned office action, the Examiner pointed out that the specification refers to a Figure 8 and objects to such a reference as no Figure 8 is provided in the drawings. Applicant amended the specification in a response to a previous Office Action to more clearly indicate that the specification is not referring to a drawing, but rather is referring to a commonly recognized flight pattern. The term "figure 8" refers to a travel in a curved path forming the number "8" and is recognized in aircraft flight, ice-skating and racetracks among other things. Applicant respectfully points out that as the specification currently reads, no drawing is referred to, but merely a common flight pattern, and therefore requests that the Examiner withdraw this objection to the specification.

2. Rejections Under 35 U.S.C. § 112

In the above-mentioned office action, the Examiner identified several claims that failed to particularly point out and distinctly claim the subject matter of the invention. Applicant amended Claims 27-30, 32 and 33 in the amendment filed on June 13, 2002 as suggested, and respectfully submits that the claims as previously amended meet the requirements of 35 U.S.C. § 112. Accordingly, Applicant requests confirmation that this rejection has been withdrawn.

3. Rejections Under 35 U.S.C. § 102

In a Final Office Action dated April 23, 2002, the Examiner rejected Claims 24, 26, 27, 32-34, 36, and 37 under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 4,725,956 to Jenkins ("Jenkins"). The Examiner noted that Jenkins discloses a control system for a remote-controlled aircraft with a receiver 26, a control module 35 in communication with the receiver to send out modified signals to a control flight system, and positioning module 15 (Figure 1, and column 3, lines 37-40). The Examiner also stated that the control module is a microprocessor/microcontroller inherently containing memory such as RAM and that it is well known in today's computer technology for such memory to store instructions.

To be anticipatory under 35 U.S.C. § 102, a reference must teach each and every element of the claimed invention. *See Hybritech Inc. v. Monoclonal Antibodies, Inc.*, 802 F.2d 1367, 1379 (Fed. Cir. 1986). "Invalidity for anticipation requires that all of the elements and limitations of the claim are found within a single prior art reference. ...There must be no

difference between the claimed invention and the reference disclosure, as viewed by a person of ordinary skill in the field of the invention." *See Scripps Clinic & Research Foundation v. Genentech, Inc.*, 927 F.2d 1565 (Fed. Cir. 1991).

Jenkins discloses a system for controlling an aircraft from a ground station via a voice interface for the user. The current position of the aircraft is determined by sensors in the aircraft and this position information is transmitted by an autopilot module to a ground station for display on the ground station instrumentation. As explained in Jenkins, ***these sensor (telemetry) signals are not used to control the flight path of the aircraft***. In Jenkins, user-provided voice control signals transmitted from the ground are translated directly into control signals ***with no input whatsoever from the telemetry***, and these control signals are what control the flight of the aircraft.

In contrast, Applicant's claims relate to a system that modifies the control signals from the transmitter by taking telemetry input from the sensors on the aircraft. Independent Claim 24 recites a control module that receives control signals from the ground and positioning signals from the aircraft's position sensors, and is adapted to output modified control signals based on the received control signals *and received positioning signals*. As explained in the specification, the recited control module reviews the transmitted control signals received from the ground and compares them to the current telemetry of the aircraft. If the control module determines that the transmitted control signals will put the aircraft in an unsafe flight mode, the control module modifies the received control signals to position the aircraft in a safer configuration. Claim 34 similarly recites that the control module *utilizes the transmitted control signals and the position signals to output modified control signals* to at least one flight control system.

There is no teaching in Jenkins of utilizing the telemetry data of the aircraft to modify control signals transmitted to the flight control system. To the contrary, Jenkins teaches away from such use of the telemetry in column 3, lines 10-15, 37-41 and 48-51, which all indicate that the telemetry data generated in the aircraft is only transmitted by the autopilot module to the ground receiver for display on a flight gauge, and ***not*** used by the autopilot to position the control surfaces of the aircraft.

In a telephone conversation held on July 1, 2002, the Examiner stated that Jenkins includes an "Autopilot" and that autopilots, as a matter of common knowledge, operate to prevent the aircraft from crashing. Thus, the Examiner appears to believe that the term

"autopilot" inherently teaches modifying transmitted control signals by reading telemetry data. However, with respect to the Jenkins reference, this cannot be true because the functionality of his autopilot is clearly and specifically explained. Jenkins discloses that, "[t]he [autopilot] system 15 is configured to accept roll, pitch, and yaw rate commands as well as throttle commands...[and] provides airspeed, vertical speed, attitude, turn and slip, altitude, and power data ***for transmission to the ground subsystem*** 23 ***and for display by ground pilot's flight instrument display system*** 19." (col. 3, lines 35-41). Jenkins further discloses that, "***data from aircraft motion sensors 33, heading sensor 37 and altitude sensor 39 are transmitted to the ground substation*** *23* via telemetry transmitter 28." (col. 3, lines 42-51)(emphasis added) Jenkins makes no mention of modifying transmitted control signals by taking input from the telemetry data. Therefore, Jenkins does not disclose an autopilot having the functionality of independent modification of control signals transmitted by the ground station, but only a transmission of telemetry signals to the ground station. Jenkins further teaches away from such a suggestion by stating that, "[t]he modular autopilot 35 positions control surfaces 18 ***in accordance with commands received from the voice command input system*** 21 utilizing servos 17...." (col. 3, lines 52-54), thus confirming that no telemetry data is used to modify the control signals that are sent to the control surfaces.

The Examiner implies that the invocation of the term autopilot confers upon Jenkins some inherent functionality that is not disclosed. Any evidence of inherent meaning must make clear that the missing descriptive matter is necessarily present in the thing described in the prior art reference, and that it would be so recognized by persons of ordinary skill. *Continental Can Co. USA. Inc. v. Monsanto Co.*, 948 F.2d 1264, 1269 (Fed. Cir. 1991) (quoting *In re Oelrich*, 666 F.2d 578, 581, 212 U.S.P.Q. 323, 326 (CCPA 1981)). However, Jenkins does not teach the functionality ascribed by the Examiner, and, in fact, teaches away from such functionality. In order for Jenkins to inherently teach a system that modifies the transmitted control signals, such a description would have to necessarily and directly flow from this reference. *Eli Lilly and Co. v. Barr Laboratories*, Inc., 99-1262, -1263, -1264, -1303 (Fed. Cir. May 30, 2001). However, as discussed above, this is not the case. Hence, Applicant respectfully submits that independent Claims 24 and 34 are not anticipated by Jenkins. Moreover, dependent Claims 25-33 and 35-40 would also not be anticipated by Jenkins as they depend from claims not anticipated by Jenkins.

For these reasons, Applicant respectfully requests withdrawal of all rejections under 35 U.S.C. § 102.

2. Rejections Under 35 U.S.C. § 103

In the above-mentioned office action, the Examiner rejected Claims 18-21, 23, 25, 29-31, 35, 39 and 40 under 35 U.S.C. § 103(a) as being unpatentable over Jenkins in view of U.S. Patent No. 4,206,411 to Meyer ("Meyer"). The Examiner argued that Jenkins disclosed all parts of the invention except pulse-width modulated signals and the modified guidance signals that result in the aircraft entering a predetermined flight pattern in case of an emergency. The Examiner also argued that Meyer disclosed pulse-width modulated signals and modified guidance signals that change the flight pattern of the aircraft to a predetermined flight pattern in case of emergency or any other situations. The Examiner concluded that, "[i]t would have been obvious to one skilled in the art at the time the invention was made to have used pulse-width modulated signals and a computerized system in which modified guidance signals... change the flight pattern of the aircraft to a predetermined flight pattern in case of an emergency... to prevent the aircraft from crashing."

To establish a *prima facie* case of obviousness each and every element of the claim must exist in the prior art and to combine those prior art references, a three-prong test must be met. First, there must be some suggestion or motivation, either in the references or in the knowledge generally available among those of ordinary skill in the art, to modify the reference. Second, there must be a reasonable expectation of success found in the prior art. Third, the prior art reference must teach or suggest all the claim limitations. *In re Vaeck*, 947 F.2d 488 (Fed. Cir. 1991).

Meyer discloses a system in a remotely controlled aircraft for responding to a loss of control signal from the remote control transmitter. The on-board control system measures characteristics of the flight control signals sent from the transmitter and when those characteristics fall out of a predetermined range, the control system replaces them with preprogrammed control signals to put the aircraft in a safe flight pattern.

However, as discussed above, Jenkins does not disclose a system that uses positioning signals corresponding to the attitude of the aircraft to modify control signals sent by a ground transmitter, as recited in Claims 18, 24 and 34.

Meyer does not correct this deficiency. Meyer simply describes a system that switches between pilot control and automated control when the aircraft stops receiving control signals.

Since neither Meyer nor Jenkins teach this element, their combination could not render the claims obvious. Moreover, neither reference provides a motivation or suggestion to allow the on-board flight control module to utilize telemetry signals to modify the control signals that are sent to the aircraft flight control systems. Therefore, Applicant respectfully submits that independent Claims 18, 24 and 34 and any claims depending from them are patentable under 35 U.S.C. § 103(a), and respectfully requests allowance of those claims.

The Examiner also rejected dependent Claim 22 under 35 U.S.C. § 103(a) over Jenkins in view of Meyer and further in view of U.S. Patent No. 4,821,572 to Hulsing ("Hulsing").

Hulsing discloses a multi-axis accelerometer that measures acceleration in various axes. The Examiner argued that it would have been obvious to one skilled in the art at the time of the invention to have used Hulsing's accelerometer in Jenkin's system "to allow the aircraft to determine its own acceleration." However, as discussed above, the combination of Jenkins and Meyer could not render these claims obvious. Accordingly, adding Hulsing does not make these claims obvious. For this reason, Applicant respectfully requests withdrawal of this rejection.

The Examiner also argued, in rejecting Claim 31, that it would be obvious to one skilled in the art at the time the invention was made to align the pulse modulated signals received by the aircraft at their leading edge. However, the Examiner did not state any source for, or examples of, such common knowledge in the art. Moreover, the Meyer reference specifically illustrates the pulse-width modulated signals in series in Figure 1, and not aligned at their leading edge. Contrary to M.P.E.P. § 706.02(j), the Examiner summarily dismisses a significant advance in the field of remote aircraft piloting, and failed to provide the proposed modification to Meyer that would allow the alignment of the leading edges of the aircraft control signals, as such alignment is not expressed or implied in Meyer. The Examiner also failed to provide any motivation to make the proposed modification, which is also required by M.P.E.P. § 706.02(j), other than to say that the modification is "to allow the aircraft to fly as desired by the pilot." (Office Action page 4) Applicant respectfully submits that there is no modification disclosed in Meyer to align the leading edge of the signals received in series, and no motivation exists either in Meyer or the knowledge of those of ordinary skill in the art to perform any such modification. For this reason, Applicant respectfully requests withdrawal of this rejection.

Appl. No. : **09/611,177**
Filed : **July 6, 2000**

CONCLUSION

Applicant has endeavored to address all of the Examiner's concerns as expressed in the outstanding Office Action. Accordingly, amendments to the claims for patentability purposes pursuant to statutory sections 102, 103 and 112, the reasons therefore, and arguments in support of the patentability of the pending claim set are presented above. Any claim amendments that are not specifically discussed in the above remarks are not made for patentability purposes, and it is believed that the claims would satisfy the statutory requirements for patentability without the entry of such amendments. Rather, these amendments have only been made to increase claim readability, to improve grammar, and to reduce the time and effort required of those in the art to clearly understand the scope of the claim language.

In light of the above amendments and remarks, reconsideration and withdrawal of the outstanding rejections is specifically requested. If the Examiner finds any remaining impediment to the prompt allowance of these claims, Examiner is respectfully requested to contact the undersigned at the Examiner's earliest convenience.

Please charge any additional fees, including any fees for additional extension of time, or credit overpayment to Deposit Account No. 11-1410.

Respectfully submitted,

KNOBBE, MARTENS, OLSON & BEAR, LLP

Dated: 22 July 2002

By: _____
Jeffrey A. Birdsall
Registration No. 46,200
Attorney of Record
620 Newport Center Drive
Sixteenth Floor
Newport Beach, CA 92660
(619) 235-5880

Appl. No. : 09/611,177
Filed : July 6, 2000

VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS

18. (Twice Amended) A method of modifying a flight pattern of a remote controlled aircraft onboard said aircraft, comprising:

reading control signals from a transmitter;

reading positioning signals corresponding to a current attitude of said aircraft from a positioning module;

determining, based on said current attitude, if said control signals will place said aircraft in a flight or pattern outside of a set of defined performance parameters; and

modifying said control signals so that said flight pattern is within said set of defined performance parameters.

23. (Twice Amended) The method of Claim 20, wherein said control signals comprise pulse-width ~~pulsewidth~~ modified signals.

24. (Amended) A control system in a remote-controlled aircraft, comprising:

a receiver for receiving control signals from a transmitter;

a positioning module that provides positioning signals representing the attitude of said~~the~~ remote control aircraft; and

a control module that receives said control signals and said positioning signals, and is adapted to output modified control signals to at least one flight control system of said remote-controlled aircraft based on both said~~the~~ received control signals and said received positioning signals.

34. (Twice Amended) A system in a remotely controlled aircraft for preventing crashes ~~of a remote controlled aircraft~~, comprising:

a receiver for receiving control signals from a transmitter;

a positioning module that provides positioning signals representing an attitude of the remote controlled aircraft; and

a control module adapted to read said control signals and said positioning signals and further adapted to output modified control signals to at least one flight control system of said remote controlled aircraft in order to reduce a risk of crashing said aircraft.